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EAST Initiative

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EAST Initiative

This Brief

Summary Points

- EAST, an educational model that is connected to STEM (Science, Technology, Engineering and Math), was first developed in 1996 in Arkansas.
- EAST students complete projects through the use of teamwork and technology.
- In schools that offer EAST, students have the choice to sign up for an EAST class, which counts as an elective.
- EAST is most commonly found in middle schools and high schools, but is expanding to elementary schools and post-secondary institutions.
- Each year, EAST hosts an annual conference in Hot Springs, where students show off their projects and attend an awards banquet.
- EAST's newest program, EAST Core, integrates the EAST model into core classes in high school.
- The EAST model has been supported through research.

EAST (Environmental and Spatial Technology) is an educational program developed through the vision of one Arkansas educator in 1996. Since then, EAST programs have been implemented throughout Arkansas and have even expanded into other states. This policy brief describes the EAST model and provides spotlights on schools that are using the model in exemplary ways.

Introduction

One challenge that many educators face is finding ways to engage their students. For these students, providing a real-world context can increase their motivation to succeed. EAST seeks to provide students with this opportunity.

In the EAST model, students develop service projects based on their interests and by identifying problems or needs in their local communities. EAST projects are accomplished through teamwork and the use of technology.

For example, in 2013, EAST students at Hot Springs High School were made aware of a city engineering problem involving flash flooding in the downtown area of Hot Springs. The city was working on breaching an underground tunnel and channelizing it to improve drainage. Students came up with the idea of scanning the tunnel and then printing out a model on the 3D printer they had recently built. Students teamed up with American LIDAR laser equipment company, the City of Hot Springs, and the University of Arkansas-Fayetteville in order to accomplish this engineering project. Students completed an underground expedition to scan city tunnels and caves and then provided renderings and a model of the current structure for city officials and engineers. After about a month of work, students presented their model and data to the city's engi-

Hot Springs High EAST students scanning tunnels

For their 3D model, EAST at Hot Springs High School was named a National Finalist in the 2013 Samsung "Solve for Tomorrow" Challenge.

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As demonstrated by this project, the EAST classroom is unique. There are no lectures and no tests. Instead, students are guided by an EAST facilitator (a teacher trained in the EAST process) through projects that have real world application and relevance. EAST believes that their model's approach better prepares students for both college and careers, as project-based learning develops skills that are needed for life beyond the K-12 classroom such as critical thinking, problem-solving, communication, collaboration, and taking responsibility.

Additionally, EAST students' use of cutting-edge technology helps prepare them to use equipment and devices that they are likely to encounter in the workplace and in higher education. Lastly, the community service element of EAST can prepare students for extracurricular and service involvement that can be an important part of one's college experience.

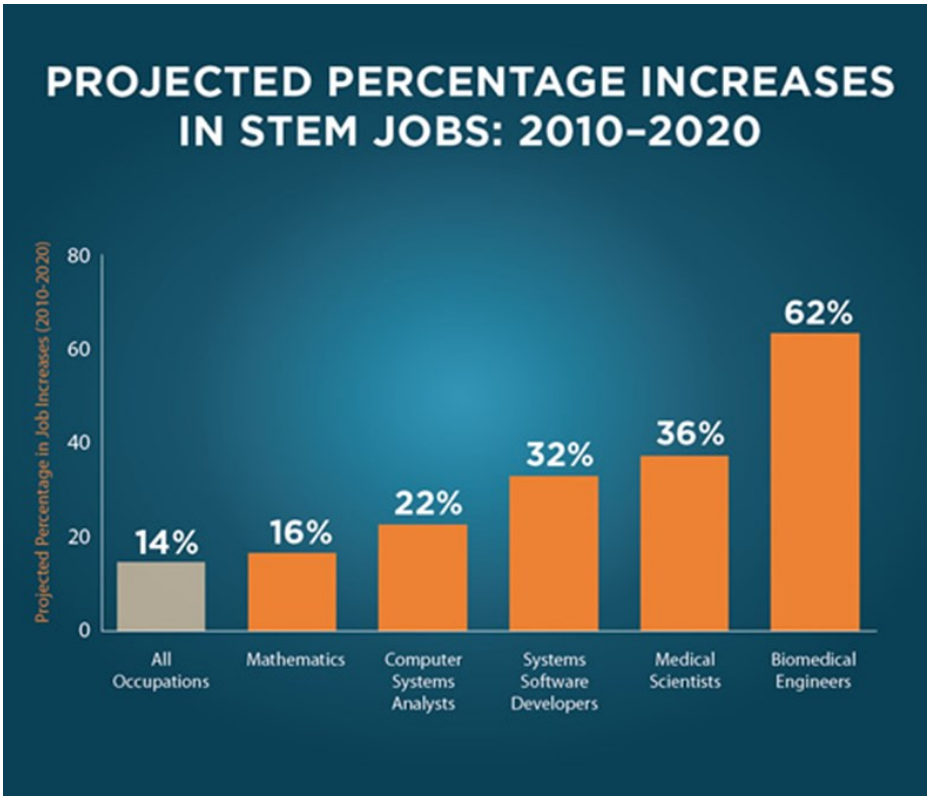
History of EAST

The EAST Initiative began in Greenbrier, Arkansas in 1996. Former law enforcement officer Tim Stephenson was in his first year of teaching. In an effort to connect with his at-risk students, Stephenson organized an outing to a wooded area with a creek and pond, where students sometimes went to skip classes. The first EAST project turned out to be building a bridge across that creek. One of the students' parents volunteered to help teach students how to design the bridge by using technological tools. Stephenson's students were excited about their accomplishment and proposed more projects. To help with these future projects, Stephenson arranged a partnership between his students and an Arkansas technology firm. From this point on, EAST has technology firm. included a technology component.[1]

Since then, Stephenson's idea has spread. Over 196 schools in Arkansas have an EAST program, including high schools, middle schools, and elementary schools. The EAST model has also spread to several other states, including California, Iowa, Louisiana, Oklahoma, and Pennsylvania.[1]

STEM Connections

EAST has an important connection to the national movement to improve STEM (Science, Technology, Engineering and Math) education. The STEM movement has grown out of concern that fewer students have expressed interest in STEM-related fields and that many teachers are not prepared to teach these subjects. In 2009, President Obama launched the Educate to Innovate Initiative, intended to improve students' achievement in science and math.[2] Another important reason for prioritizing STEM education is the projected increase of STEM jobs in the future.[3]



In 2013, **Change the Equation**, a nonprofit, nonpartisan, CEO-led coalition that is mobilizing the business community to improve the quality of STEM learning in the United States, selected EAST for inclusion in its **national database** of quality STEM educational programs. Among the programs nationally that met the rigorous criteria for inclusion, EAST is one of only ten to receive full recognition for each category of science, technology, engineering and mathematics.

In 2011, STEM's role in Arkansas increased significantly when Governor Mike Beebe announced STEM Works, a pilot program designed to transform education in order to meet the state's increasing demand for employees in high-tech fields.[4] STEM Works' focus is as follows:

- prepare STEM teachers skilled in problem-based learning
- create secondary schools designed around hands-on learning, student collaboration, and projects that integrate the Common Core curriculum from multiple subjects
- foster the development of 21st century student skills that match the needs in industries

EAST Core, which will be described in more detail later, is another component of STEM Works.

EAST Events

Along with the daily work that goes on in EAST classrooms across Arkansas, EAST also provides annual events that allow local EAST programs to connect with the public, showcase their work and network with students and facilitators from other programs.

First, schools host EAST Night Out every fall, which is an evening when students host open house events for the local community to view their projects.

Additionally, an annual EAST conference is held, where students present their work in a trade-show environment. The EAST conference is held in the spring of each year in Hot Springs, Arkansas, and brings together teams and projects from all participating schools. In the formative years of EAST, each team brought one project to display, but this is no longer a requirement and teams bring multiple projects. Members of the OEP attended the conference this year and were impressed by the level of professionalism displayed by students. Most booths are entirely student organized and manned. EAST students dress professionally and have displays and literature prepared to hand out about projects that they have completed throughout the past year. Articulate, confident students approach visitors to their booths and are able to explain their projects in great detail. Projects were very diverse, from a 6th grade orientation to help new students feel more comfortable to updating the Country Doctor Museum in Lincoln, AR. Students commented that EAST has helped them learn to use technology and has increased their interest in school. At the end of each EAST conference, an award ceremony is held. The most prestigious award, the Timothy R. Stephenson Founders Award, is given to recognize the projects that are determined by a panel of judges to be superior, and award winners receive awards in the form of technology for their efforts.[5] EAST further provides ongoing professional development opportunities for facilitators, including the Summer Seminar.

Spotlight on Sonora Elementary: Weather Balloon Project

This year, EAST's most prestigious award, the Founder's Award, was given to Sonora Elementary of Springdale. Sonora Elementary is the first elementary school to win this award. Student emcees at the event attributed much of Sonora's success to program facilitator, Josh Worthy, and their weather balloon project, in which students collected data and captured atmospheric views from video cameras attached to the balloons.

EAST students at Sonora were first introduced to weather balloons in 2012 when they hosted a balloon launch for Northwest Technical Institute (NTI). Then at their 2013 Summer Aeronautics Camp, they invited NTI back for another launch.[6] You can watch the 2013 launch here.

Through this project, students have used cutting-edge meteorological technology. Facilitator Josh Worthy stated that the project has increased engagement: "Our EAST kids are now driven to see if they can do similar projects that are being conducted at a local technical school in our community. They have been the ones searching for Launch Pad tutorials, they have created a wireless power supply for the Launch Pad, reached out to NTI for follow-up ideas and are the ones driving toward a third and final weather balloon launch."[6] Through student efforts, this final launch occurred in April 2014.

EAST Core

EAST Core, part of STEM Works, fulfills a desire to move the EAST model into curricular areas. Using the EAST model into core math and science classes has been accomplished with support from the Arkansas Department of Education.[7] Students in these courses experience hands-on, project-based learning that are connected to the Common Core State Standards. Factors that motivated the development of EAST Core include:

- Arkansas' adoption of the Common Core State Standards and Next Generation Science Standards
- An increased understanding that students need opportunities to become better communicators, problem solvers and innovators
- An increased focus on college and career readiness

Currently, EAST Core is only operating in high schools, but the organization states that if funding becomes available, they would like to expand into elementary and middle schools. The first cohort of EAST Core high schools began in 2012-13: Harrisburg High School, Hot Springs High School, Morrilton High School, Prairie Grove High School, and Star City High School. This first year focused on implementing EAST Core into Biology and Geometry. The second cohort, Malvern High School and Monticello High School, began in 2013-14 and focused on Algebra II and Chemistry. Year three's subjects have not yet been announced.

EAST Core teachers participate in training approved by the EAST Initiative and the Arkansas Department of Education.[7]

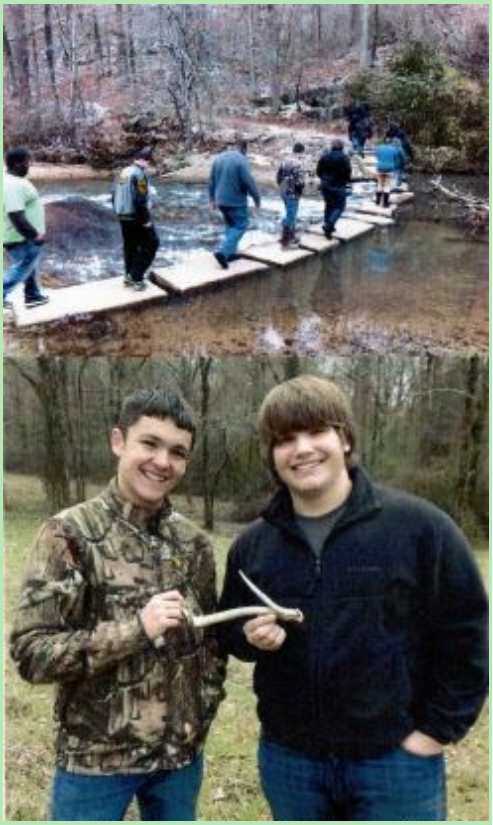
Prairie Grove Middle School EAST students planted 500 trees in March

Spotlight on Hot Springs High: Deer Population Project

Noah Flanrey and Tiffany Grayer, Algebra II teachers through EAST Core at Hot Springs High School, recognized a student interest in deer hunting and created a project around this concept that integrated the Algebra II curriculum. One student who spoke to us at the EAST conference was a deer hunter himself, which helped create a real world context for his learning.

In this project, students calculated the logistic regression to predict the carrying capacity for deer herds in a given area. Students also created maps that would be used to determine the population growth and decline of deer in Garland County. Their data was gathered in two ways: 1) information on harvested deer was obtained from the Arkansas Game and Fish Commission's website and 2) students played the role of a wildlife biologist by going into the woods, looking for signs of deer including tracks, rubs, and scat to support the accuracy of their estimate of the deer population. Later this year, students will present their findings to the Arkansas Game and Fish Commission.[8]

Students gained many skills through this project other than those within the Algebra II curriculum, including learning how to use technological programs such as ArcGIS, MovieMaker Pro, Sketchup, and Google Apps. Additionally, students honed their public speaking skills and gained experience in woodsmanship and conservation.[8]



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Research on EAST

The EAST method has been found to be a model with research-based results by the United States Departments of Education and Labor. We have chosen to include two studies in this brief, but EAST's website lists several other resources that support the model.

Metis Associates conducted a research study on EAST in 2003-2006.[9] In this study, analyses were conducted to estimate the impact of EAST participation on 16 outcomes in the areas of academic skills, problem solving skills, motivation for school, self-directed learning style, and motivation to pursue further learning. Among the 16 student outcomes that were studied, analyses indicated that participation in EAST appears to have a positive, statistically reliable impact in five domains. These included three problem solving domains (defining the characteristics of a problem, assessing the outcomes of a solution, and revising strategies in response to the assessment of outcomes), one motivation domain (motivation for school derived from accomplishment), and self-directed learning style. No direct effects were found indicating an impact of the EAST program on students' math and reading test scores, but researchers point out that the domains in which EAST was shown to have an impact are "widely recognized as being important for both academic and career success."[9]

Metis Associates also performed a follow-up study in 2009 and released the following finding:[10]

- EAST program participation frequently appeared to have a significantly positive impact on end-of-course exams for high school students when the influence of salient subject covariates was controlled.

An evaluation of EAST students in Grade 9 further suggested that participants who started the program in middle school performed significantly better than those who started the program later in high school. However, these findings should be taken with caution as observed effect sizes were often small.[10]

Conclusion

The EAST Initiative began here in Arkansas with an idea from an educator who sought to make learning relevant for his students. Since then, it has been nationally recognized for improving STEM learning, has spread to several other states, and has become an important Arkansas contribution to the world of K-12 education.

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